REMARKS

The present application includes claims 1, 3-4, 10-12, and 14-32.

By this response, claims 1, 11, 14-15, 22-23, 27, and 30-32 have been amended. No new matter has been added by these amendments.

By this response, claims 10, 12, 21, 26, 28, and 29 have been cancelled. The Applicant expressly reserves the right to purse the subject matter of the cancelled claims, and any other patentable subject matter disclosed by the application in a continuing application.

Claims 1, 4, 10-12, 14-20, 22-23, 25-28, and 30-32 were rejected under 35 U.S.C. 102(e) as being anticipated by Greppi et al., U.S. Patent No. 6,951,542 ("Greppi").

Claims 3, 21, 24, and 39 were rejected under 35 U.S.C. 103(a) as being unpatentable over Greppi further in view of Cai et al., U.S. Patent No. 6,790,181 ("Cai").

The Applicant first turns to the rejection of claims 1, 4, 10-12, 14-20, 22-23, 25-28, and 30-32 under 35 U.S.C. 102(e) as being anticipated by Greppi. The Applicant respectfully submits that Greppi does not teach the entirety of the limitations recited in the pending claims for at least the reasons discussed below.

Greppi generally relates to "a method and apparatus for ultrasound imaging of a biopsy needle ... during an ultrasound imaging examination," as stated at col. 1, lines 13-15. More particularly, as stated at col. 8, lines 14-18, Greppi "provides alternate imaging with ultrasound beam transmit parameters and with corresponding receive and processing parameters that are optimized for imaging the biopsy needle and the fluid flows respectively."

As illustrated in Figure 1 and discussed beginning at col. 9, line 23, Greppi discusses an ultrasound imaging apparatus including a probe with an array of transducers. Beginning at col. 9, line 42, Greppi states that "[t]he transducers of the array are controlled by a scan and transmit monitoring unit 2, which is in turn controlled by a scan and transmit control unit 3. This unit is controlled by a CPU 5, which is connected to a memory 6 containing the different imaging parameters for the different optimized modes for imaging the needle, body fluid flows and/or tissues." Greppi states beginning at col. 9, line 64, that "[a] unit 4 for receiving/reconstructing reflected echo signals is also connected to the transducers, and transmits data to one of the three different processing sections 8, 8', 8'', each specifically dedicated to the processing of echo signals generated by a scan with the particular optimized parameters and with the imaging modes associated thereto. Obviously, the one or the other processing unit is enabled in synchronism with the protocol for timed execution of the different optimized scans." That is, for the acquisition of a particular image, Greppi uses parameters and processing components that are optimized for imaging different features, such as a biopsy needle, body fluid flows, and/or tissues.

Greppi also discusses, as noted by the Examiner, beginning at col. 10, line 35, that "[t]he unit 9 may be also used to combine the different images acquired by optimized scans for imaging the needle, body fluid flows and/or static tissues. Any type of combination or sub-combination may be provided. For instance, three individual, separate images may be visualized in the display 10, each deriving from the optimized scan for the needle, body fluid flows and tissues. As an alternative thereto or in combination therewith, an image may be displayed which is formed by overlaying said three images or only two of these three images or two or three images, each obtained by overlaying only two different images of the three possible combinations." That

is, Greppi discusses various ways images acquired with different optimized parameters may be combined.

In summary, Greppi discloses using different imaging parameters for an ultrasound probe, where the different parameters are optimized to image different details in a region. For example, one set of parameters may be optimized to image a biopsy needle and a second set of parameters may be optimized to image body fluid flows. Greppi then discusses displaying the images obtained using the different parameters individually and/or overlaid.

However, Greppi does not teach or suggest generating a spatially compounded image and a non-compounded image from a set of frames. Rather, as discussed above, Greppi discusses using different imaging parameters optimized to determine different details within a region being scanned. The resulting images may then be overlaid.

Independent claims 1, 14, 15, and 32 have been amended to recite generation of an image output comprising "a spatially compounded image and a non-compounded image" based on a plurality of frames. Similar limitations were recited in claims 21 and 29, which have been cancelled. As discussed above, Greppi does not teach or suggest generating a spatially compounded image and a non-compounded image from a set of frames. Therefore, the Applicant respectfully submits that amended independent claims 1, 14, 15, and 32 should be allowable over the cited prior art.

Dependent claims 4, 11, 16-20, 22-23, 25, 27, and 30-31 depend from independent claims 1, 14, and 15. The Applicant respectfully submits that because claims 1, 14, and 15 should be allowed for the reasons discussed above, claims 4, 11, 16-20, 22-23, 25, 27, and 30-31 should also be allowed. With respect to claims 10, 12, 26, and 28, as discussed above, these claims have

been cancelled, and the Applicant respectfully submits this rejection is now moot and should be withdrawn for these claims.

The Applicant now turns to the rejection of claims 3, 21, 24, and 29 under 35 U.S.C. 103(a) as being unpatentable over Greppi further in view of Cai. The Applicant respectfully submits that neither Greppi nor Cai, alone or in combination, teach or suggest the entirety of the limitations recited in the pending claims for at least the reasons discussed below.

Cai generally relates spatial compounding. More particularly, as stated at col. 1, lines 8-10, Cai relates to "compounding component frames of data associated with different steering angles to reduce speckle." As illustrated in Figure 1 and discussed beginning at col. 4, line 1, Cai states that the "transmit and receive beamformers 12, 16 are operable to acquire a plurality of frames of data representing different overlapping regions or a same region of the patient. Each of the component frames are acquired without substantial movement of the transducer 14." Cai further states, beginning at col. 4, line 51, that the "compound processor 22 is operable to combine or compound to [sic] or more frames of data representing at least a same region for display." In addition, Cai states, beginning at col. 5, line 36, that "[d]uring the display refresh, the component frames are read, weighted, summed and thresholded to generate the image on the display 24." Thus, Cai discusses a system and method for generating a spatially compounded image based on two or more component frames of data.

However, Cai does not teach or suggest generating a spatially compounded image and a non-compounded image from a set of frames. Rather, as discussed above, Cai discusses only spatially compounding frames of data associated with different steering angles and makes no mention of a non-compounded image based on a set of frames.

As discussed above, Greppi also does not teach or suggest generating a spatially compounded image and a non-compounded image from a set of frames. Rather, as discussed above, Greppi discusses using different imaging parameters optimized to determine different details within a region being scanned. The resulting images may then be overlaid.

With respect to claims 21 and 29, by this Amendment, claims 21 and 29 have been cancelled. Therefore, the Applicant respectfully requests that the Examiner withdraw this rejection with respect to those claims.

With respect to claims 3 and 24, as discussed above, independent claims 1 and 14 have been amended to recite generation of an image output comprising "a spatially compounded image and a non-compounded image" based on a plurality of frames. As discussed above, neither Greppi nor Cai, alone or in combination, teach or suggest generating a spatially compounded image and a non-compounded image from a set of frames. Dependent claims 3 and 24 depend from independent claims 1 and 14, respectively. Therefore, the Applicant respectfully submits that because claims 1 and 14 should be allowed for the reasons discussed above, claims 3 and 24 should also be allowed.

In conclusion, the Applicant respectfully submits that claims 1, 3-4, 11, 14-20, 22-25, 27, and 30-32 should be allowed for at least the reasons discussed above.

CONCLUSION

It is submitted that the present application is in condition for allowance and a Notice of Allowability is respectfully solicited. If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below.

The Commissioner is authorized to charge any additional fees or credit overpayment to the Deposit Account of GEMS-IT, Account No. 50-2401.

Respectfully submitted,

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